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(11) **EP 1 338 412 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
27.08.2003 Bulletin 2003/35

(51) Int Cl.7: **B31F 1/07**

(21) Application number: **02076223.3**

(22) Date of filing: **28.03.2002**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU**  
**MC NL PT SE TR**  
Designated Extension States:  
**AL LT LV MK RO SI**

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(30) Priority: **22.02.2002 IT MI20020361**

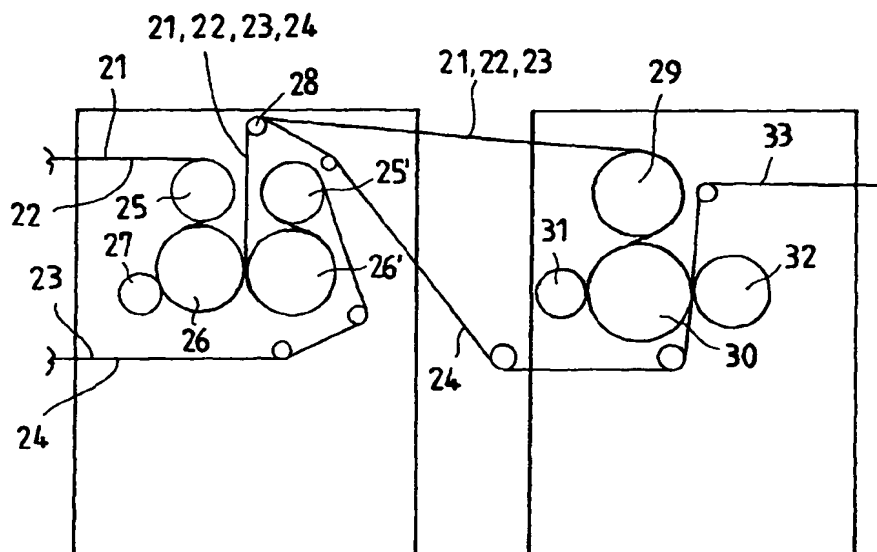
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(54) **Method for realising four-ply toilet paper and relative apparatus**

(57) A method for realising optimised four-ply toilet paper in which plies (21-24) are fed to a gluing group thereof for realising a log, which foresees introducing the plies (21-24) between two steel rollers (26, 26') after at least a pair of plies (21-22; 21-23) is made to pass between a first pair of rubber and steel rollers (25 and 26, respectively) and has received glue through a roller (27) and the remaining plies are made to pass into a second pair of rubber and steel rollers (25' and 26', re-

spectively), once again separating at least one outer ply (21; 21,22,23) from said four-ply (21-24) to feed it to a pair of rollers (29, 30), one (30) of which foresees an imprinted design before receiving glue from a further roller (31), and finally feeding at least one outer ply (21; 21,22,23) provided with glue and the remaining plies (22-24; 24) to a coupling roller (32) which determines the final sticking together of the four plies (21-24). The steel cylinders (26, 26') are alternatively of the point-to-point type.

**Fig.2**



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## Description

[0001] The present invention refers to a method for realising optimised four-ply toilet paper and to a relative apparatus.

[0002] In the field of the preparation of toilet rolls, made of paper for use at home and the like, known as "logs", the paper can have a certain variety of layers, known as plies.

[0003] Indeed, there is paper of this type with only two plies and there is paper with four plies or more.

[0004] In the case of four-ply paper, in order to try to obtain a product, that is a toilet roll, consisting of four plies stuck together, a technique for treating the paper with an embossing group is currently used, known as the "embossing sticking" technique.

[0005] Figure 1, relative to the state of the art, shows how the paper is unwound from one or more reels (not shown), and is separated into two pairs of upper 11 and lower 12 plies. These pairs of plies 11 and 12 are then sent to a pair of upper (rubber 13 and steel 14, respectively) and lower (rubber 13' and steel 14', respectively) embossing rollers.

[0006] With this embossing treatment completed the pair of upper plies 11, for example, is sent to a further group (rubber 15 and steel 16, respectively) where a design is realised on this pair of plies (for example a flower without small projections "points") upon which glue is immediately stuck through a roller 17. The pair of upper plies 11 thus treated and the pair of lower plies 12 which has only been embossed are then sent to a coupling roller 18 which determines the final sticking together of the four plies thus obtaining the end toilet paper 19, which is for example rolled back up into a log which when cut produces rolls (not shown).

[0007] One can understand how such current techniques give the result of obtaining a product where the fourth ply is only lightly stuck, that is it can be separated from the others very easily.

[0008] This means that the product which is finished in this way for the case of four plies does not completely satisfy the requirements of the market and of users, since the fourth ply is not attached in a stable manner.

[0009] The main purpose of the present invention is that of realising a method and/or an arrangement which allows this technical problem to be avoided.

[0010] Another purpose is that of realising a roll of toilet paper, as defined above, which has a uniformity of connection between the various plies.

[0011] These purposes according to the present invention are achieved by realising a method for realising optimised four-ply toilet paper and a relative apparatus as outlined in the independent claims.

[0012] Further characteristics of the invention are highlighted by the subsequent claims.

[0013] The characteristics and the advantages of a method for realising optimised four-ply toilet paper and a relative apparatus according to the present invention

shall become clearer from the following description, given as an example and not for limiting purposes, referring to the attached schematic drawings in which:

5 figure 1 is a schematic elevation view of an apparatus for realising four-ply toilet paper according to the prior art,  
figure 2 is a schematic elevation view of an apparatus for realising four-ply toilet paper according to the invention,  
10 figure 3 is a schematic elevation view of a second embodiment of apparatus for realising four-ply toilet roll according to the invention.

15 [0014] With reference firstly to figure 2, a schematic elevation view of a first embodiment of an apparatus for realising four-ply toilet paper according to the invention is shown.

[0015] In such an apparatus the method for realising optimised four-ply toilet paper of the invention is used.

20 [0016] Figure 2 shows how, also in this case, the paper is unwound from one or more reels (not shown), and is separated into two pairs of upper 21,22 and lower 23,24 plies. The pair of upper plies 21,22 is then sent into a pair of upper rollers (rubber 25 and steel 26, respectively) after which it receives glue through a roller 27.

25 [0017] The other pair of lower plies 23, 24 is also fed to a pair of lower rollers (rubber 25' and steel 26', respectively), The two pairs of upper 21,22 and lower 23,24 plies thus treated are made to pass between two steel rollers 26 and 26'. Alternatively, it is possible to use point-to-point steel rollers, using a slight compression if one should wish to obtain a greater volume in the end product (greater diameter of the roll for the same number of tears and length of tear).

30 [0018] In correspondence with a deviator roller 28 the grouped pairs of plies 21,22 and 23,24 are separated into three plies 21,22,23 and into a single ply 24.

35 [0019] The three plies 21,22,23 are sent to a further group of two rollers (one of rubber 29 and the other of steel with an imprint 30) where upon these three plies a printed design (for example a flower) is realised upon which glue is immediately stuck through a roller 31. The single ply 24 is fed just as are the three plies 21,22,23, equipped with glue, to a coupling roller 32 which determines the final sticking together of the four plies 21,22,23,24 thus obtaining the end toilet paper 33, which is, for example, rolled up into a log (not shown).

40 [0020] In this way one obtains the perfect sticking also of the fourth ply which, according to the prior art, one could not manage to realise.

45 [0021] This is so since the first three plies 21,22,23 are perfectly stuck, also thanks to the passage between the rollers 29 and 30, whereas the fourth ply 24 is equipped with glue distributed onto the three plies 21,22,23 by the roller 31 and is connected stably to the others through the coupling roller 32. In this way, the

method of the invention is carried out obtaining a perfect product with an "imprint", perfectly stuck on every ply of which it consists.

[0022] Alternatively and advantageously, the roller 31 can feed a coloured glue onto the three plies 21,22,23 so as to have a colour effect, after the intervention of the coupling roller 32, on at least one side of the four-ply paper thus produced 33.

[0023] Figure 3 shows a schematic elevation view of a second embodiment of apparatus for realising four-ply toilet paper according to the invention. Elements which are the same are indicated with the same reference numerals where possible also in this second embodiment.

[0024] In this apparatus there is a different initial feeding of the paper.

[0025] Three plies 21,22,23 are fed above and a single ply 24 is fed below so as to then be sent into the pair of upper rollers (rubber 25 and point-to-point steel 26, respectively) after which they receive glue through a roller 27.

[0026] The lower ply 24 is also fed to a pair of lower rollers (rubber 25' and point-to-point steel 26', respectively). The three upper plies 21,22,23 and the lower ply 24 thus treated are then made to pass between the two point-to-point steel rollers 26 and 26'.

[0027] In correspondence with a deviator roller 28 the four plies 21,22,23 and 24 thus brought together are once again separated into one ply 21 and three plies 22,23,24, respectively.

[0028] The single ply 21 is sent to a further group of two rollers (one of rubber 29 and the other of steel with an imprint 30) where upon this ply a printed design (for example a flower) is realised, upon which glue is immediately stuck through a roller 31. The three plies 22,23,24 are fed just as is the single ply 21, equipped with glue, to a coupling roller 32 which determines the final sticking together of the four plies 21,22,23,24 thus obtaining the end toilet paper 33, which is, for example, rolled up into a log (not shown).

[0029] Also in this way one obtains the perfect sticking also of the fourth ply which, according to the prior art, one could not manage to realise.

[0030] In this way the method of the invention is carried out obtaining a perfect product with an "imprint", perfectly stuck on every ply of which it consists. In a certain sense a method is carried out which in a first step embosses and sticks and in a second step realises an imprint and sticks.

[0031] Alternatively and advantageously, the roller 31 can feed a coloured glue onto the ply 21 so as to have a colour effect, after the intervention of the coupling roller 32, on the outer side of the four-ply paper thus produced 33.

[0032] It has been seen how a method for realising optimised four-ply toilet paper and a relative apparatus according to the present invention can achieve the purposes evidenced above.

[0033] The method for realising optimised four-ply toi-

let paper and the relative apparatus of the present invention thus conceived are susceptible to numerous modifications and variants, all of which are covered by the inventive concept itself.

[0034] Moreover, in practice the materials used, as well as their size and components, can be whatever according to the technical requirements.

## 10 Claims

1. Method for realising optimised four-ply toilet paper in which plies (21-24) are fed to a gluing group thereof for realising a log, **characterised in that** said plies (21-24) are introduced between two steel rollers (26, 26') after at least a pair of plies (21-22; 21-23) have been made to pass between a first pair of rubber and steel rollers (25 and 26, respectively) and have received glue through a roller (27) and the remaining plies are made to pass into a second pair of rubber and steel rollers (25' and 26', respectively), **in that** at least one outer ply is once again separated (21; 21,22,23) from said four-ply (21-24) to feed it to a pair of rollers (29, 30) one (30) of which foresees an imprinted design before receiving glue from a further roller (31), and finally **in that** said at least one outer ply (21; 21,22,23) provided with glue and the remaining plies (22-24; 24) are fed to a coupling roller (32) which determines the final sticking together of the four plies (21-24) thus obtaining the end toilet paper (33).
2. Method according to claim 1, **characterised in that** three plies (21-23) are separated to feed them to a pair of rollers (29, 30), one (30) of which foresees said imprinted design.
3. Method according to claim 1, **characterised in that** in said first pair of rubber and point-to-point steel rollers (25 and 26, respectively) three plies (21-23) are fed and in said second pair of rubber and point-to-point steel rollers (25' and 26', respectively) one ply (24) is fed.
4. Apparatus for realising optimised four-ply toilet paper in which plies (21-24) are fed to a gluing group thereof for realising a log, **characterised in that** two pairs of rubber and steel rollers (25 and 26, respectively) are foreseen, in which two steel rollers (26, 26') of each pair are arranged facing each other to receive said plies (21-24) after at least one pair of plies (21-22; 21-23) has been made to pass between a pair of rubber and steel rollers (25 and 26, respectively), a glue dispensing roller (27) associated with a point-to-point steel roller (26) and a deviator roller (28) which brings said plies (21-24) back together, upstream of said deviator roller (28) being foreseen a pair of rollers (29, 30), one (30) of

which foresees an imprinted design which receives at least one outer ply (21; 21,22,23) once again separated from said four plies (21-24) and being foreseen a glue dispensing roller (31) associated with said roller equipped with an imprinted design (30), and downstream being foreseen a coupling roller (32) which determines the final sticking together of the four plies (21-24).

5. Apparatus according to claim 4, **characterised in that** said steel rollers (26, 26') are of the point-to-point type.

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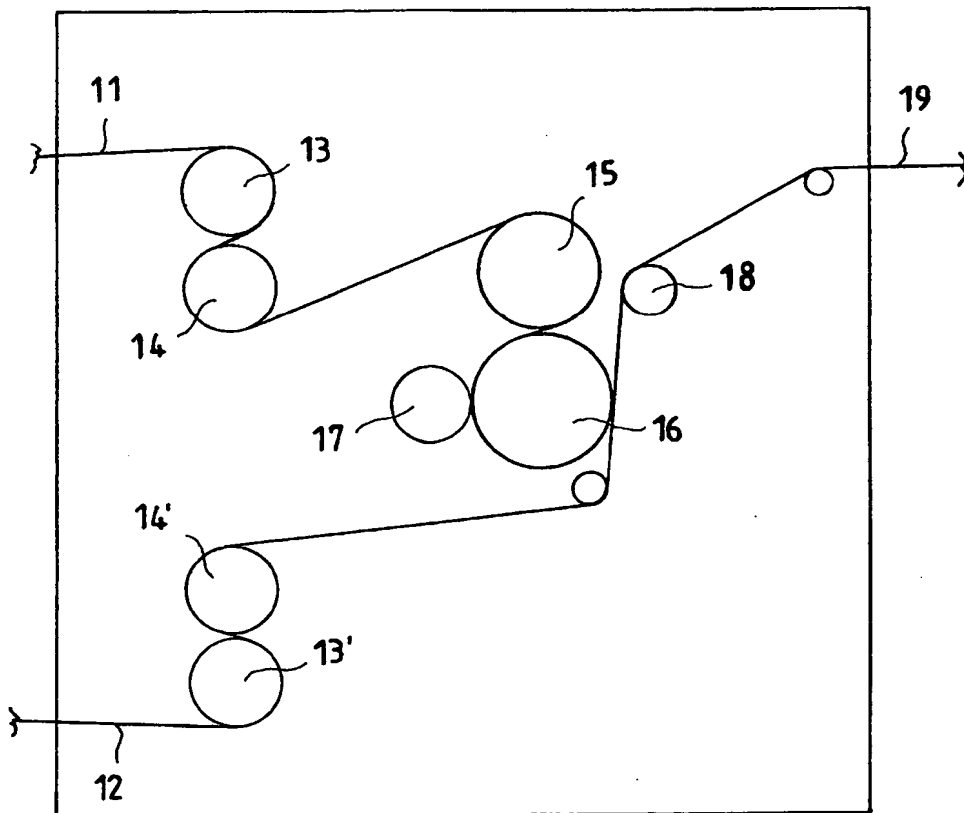
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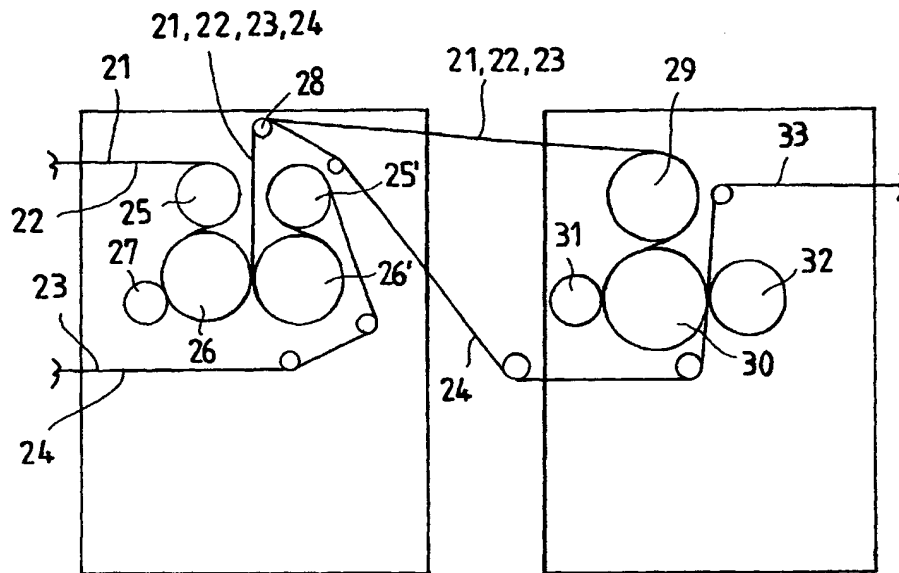
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Fig.1

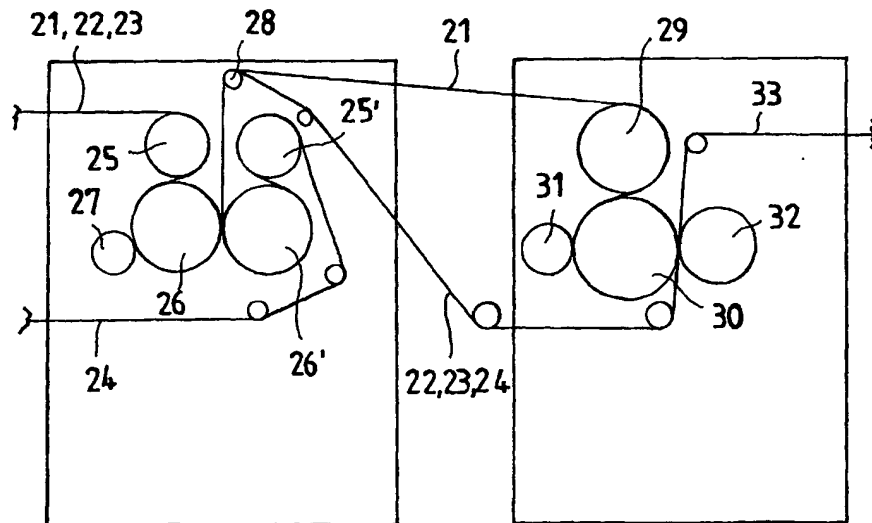
PRIOR ART



**Fig.2**



**Fig.3**





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# EUROPEAN SEARCH REPORT

Application Number  
EP 02 07 6223

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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23 October 2002	Examiner J-E. Söderberg
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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